

Walter M. Meinert, P. E.

CONSULTING ENGINEER

P. O. BOX 6291

GRAND RAPIDS, MICHIGAN 49506

TELEPHONE (616) 949-3121

US EPA RECORDS CENTER REGION 5



544686

GROUND WATER INVESTIGATIONS & REPORTS
WELL FIELD ANALYSIS & DESIGN
EARTH RESISTIVITY SURVEYS

January 8, 1979

Mr. Carl V. Huber, P. E.
Fishbeck, Thompson, Carr & Huber, Inc.
1500 East Beltline S. E.
Grand Rapids, Michigan 49506

Dear Mr. Huber:

Subject: Northeast Gravel Company and House Street Site - Hydrogeology

In accordance with your request, this office has conducted an investigation relating to the local geologic and hydrogeologic conditions at the Northeast Gravel Company site and the House Street site. The purpose of these evaluations were to aid in the selection of an area for the disposal of tannery wastes from Wolverine World Wide, Inc., Rockford, Michigan.

Northeast Gravel Company

This site is situated in the NW 1/4 of Section 24, Plainfield Township, Kent County. This study was conducted on the Northerly portion of the gravel pit operated by the Northeast Gravel Company, 4300 Cannonsburg Road.

General Geology

The study area for the Northeast Gravel Company pit operation is approximately 3,500 feet North of the Grand River. The surface elevations found on the site range from 620 feet to 670 feet. Prior to local excavations, the low elevation was probably in the range of 650 feet. The site is situated on a terrace of the glacial Grand River that appears to extend, in this area, to an elevation of 680-690 feet.

The deposition of glacial outwash materials found in this area may also have been influenced by the glacial Rouge River which flowed Southerly. The present mouth of the Rouge River, where it enters the Grand, is approximately 7,000 feet to the West.

Typical moraine topography is located approximately 1,500 feet to the Northeast. Regionally, this is an interlobate area where the Michigan and Saginaw ice lobes met. Locally, however, the area is probably part of the Middle Charlotte Moraine of the Saginaw lobe. Interlobate type deposits are characterized by heterogeneous mixtures of sand, gravel and clay with assorted large boulders. The action of the Grand and Rouge Rivers in this instance,

Mr. Carl V. Huber, P. E.

Page -2-

January 8, 1979

however, washed away much of the finer silts and clays and left behind the coarser grained sand and gravel deposits.

Soil Borings

Approximately fifteen (15) soil borings were made by the Northeast Gravel Company in 1971. Fifty-seven (57) additional borings were made in 1974 by Prein & Newhof, Consulting Engineers. The purpose of these borings was to locate favorable gravel deposits which could be excavated.

Eleven (11) borings were made by the Stearns Drilling Company as part of this study. These borings were made using hollow stem auger methods. Well points were installed in nine of these borings using 1-1/4 inch galvanized pipe for casings. The purpose of these observation holes was to collect information on ground water movement and quality.

These eleven borings ranged in depth from 30 feet to 80 feet. Well points were set at different depths to learn the effects of the recorded silty clay deposits.

The drillers log of each hole is contained herewith and indicates a predominance of coarse to fine sand with traces of silty clay.

General Hydrology

From visual site inspections, it is evident that there are varying ground water conditions. These varying conditions are in the form of relatively high ground water levels found nearly adjacent to excavated areas which appear to be dry. Several surface depressions in the Northerly, higher elevations contain water which is being discharged to the South in the form of small surface streams. These streams disappear into the subsurface in the central portions of the property.

Ground water levels as measured within the observation holes ranged from elevation 653.29 feet (Northwest corner) to 617.13 feet in the Easterly area. This, however, does not imply that the ground water movement is towards the East. Areally the direction of ground water flow is North to South or towards the Grand River. What appears as local variations in the direction of ground water flow are the result of excavations which have penetrated impervious materials in the form of silty clay. The location of all observation holes, together with water level measurements, are shown on the included plan. These water level measurements have been contoured and reflect the potentiometric surface of the ground water.

From the results of all data collected during this study, it appears that two separate water surfaces exist. The upper or shallow surface is contained by the aforementioned silty clay deposits. Where this water surface is near the ground surface, any shallow excavation results in a wet hole. However, when an excavation penetrates the impervious silty clay layers, the shallow ground water is permitted an outlet. This outlet is in the form of seepage which is

Mr. Carl V. Huber, P. E.

Page -3-

January 8, 1979

visible along the banks of the deeper excavations. With eventual sloughing of the bank face, the majority of this ground water movement is not visible. The movement of this shallow ground water is then reflected by a sudden increase in the gradient towards the lower or deeper water surface. This lower ground water surface is at elevations 610-620 feet and situated below the bottom of the deeper excavations. This lower water surface also acts as the area recharge to the Grand River.

Disposal Areas

To provide areas for the continued use for sludge disposal, it would appear prudent to consider; (1) areas that would provide a degree of separation between the sludge mass and the ground water surface and (2) areas that would not interfere with current or proposed gravel operations. It therefore appears that any higher surface elevations situated along the Westerly property line may provide a limited volume of storage. If the relatively high ground water levels can be lowered 3-4 feet through excavation, perhaps additional disposal areas can be provided in the North central portions of the property. If any of the completed deeper excavations provide adequate separation from the ground water surface, they also can be considered for sludge disposal.

House Street Site

This site is located in portions of the NW 1/4 and SW 1/4 of Section 4, Plainfield Township, Kent County. This proposed area consists of approximately 60 acres.

General Geology

This study area is situated approximately three miles North of the Grand River and approximately one mile South of the Rogue River. The elevations of the ground surface vary in the range of feet. Localized earthwork in the Southerly portions of the property have resulted in lower elevations of approximately 750 feet.

Regionally, this area is considered as having experienced interlobate type deposition. This type of deposit occurs when the ice front from the Michigan lobe, advancing from the West, was met by the ice front from the Saginaw lobe, advancing from the Northeast. The resulting deposition is characterized by heterogeneous mixtures of sand, gravel, and clay. Locally, however, the area is depicted as a typical morainic deposit. This is the result of a stagnated ice front and usually consists of mixtures of sand, gravel, and clay. It appears that the action of the Grand and Rogue Rivers have not had the effect on this site as they have on the Northeast Gravel Company site.

Soil Borings

Six (6) soil borings were made on the House Street site. Well points were installed in all borings for the purpose of obtaining water level data. These

Mr. Carl V. Huber, P. E.

Page -4-

January 8, 1979

borings were made by the hollow stem auger method. The six soil borings ranged in depth from 65 to 80 feet. The drillers logs of these borings are shown on the included plan. These logs showed a predominance of fine sand with streaks of silty clay in the near surface areas.

Hydrology

Water levels were measured in all six monitoring wells in July, 1978. These water levels ranged in elevation from 723.72 feet to 720.14 feet. From inspection of the drillers logs and ground water levels, it is evident that the ground water occurs under water table conditions. These water surface elevations have been plotted and contoured on the included plan. From this plan we can see that the direction of ground water flow is towards the Southwest. We can also see from the drillers logs that there is between 62 feet and 77 feet of dewatered materials above the water table at this site. The amount of relatively impervious materials ranges between 4 and 11 feet within the six borings.

With the direction of ground water flow towards the Southwest, we must be concerned with any down gradient residential wells. There appears to be one residence within 300 feet of the Southwest corner of the property with several others situated beyond 1,500 feet in the down gradient direction. The drillers logs of these wells have not been reviewed at this time. Those domestic wells located East and North of the site should not be affected by any work within the site. If it is desired to maintain maximum separation between the bottom of any disposal material and the ground surface, we can see that this site does provide for 65-75 feet of dewatered materials.

From inspection of only six borings, it appears that the thicker deposits of the relatively impermeable silty clay occurs in the Northwestern regions of the property. However, if this site is considered as a disposal area, additional borings should be made to more clearly define those areas containing maximum impermeable materials.

Very truly yours,



Walter W. Meinert, P. E.
Consulting Engineer

1m1